This bundle contains version 2.0 MRO MARCI Mars Daily Global Maps (MDGMs). Each MDGM is a daily global mosaic of Mars (90S-90N, 180W-180E) on a regular latitude / longitude grid (with 0.1 degree or 0.05 degree spatial resolution). It is composed of 13 consecutive global map swaths taken by the MRO MARCI instrument. A global map swath is a pole-to-pole, limb-to-limb wide-angle image which is gradually built up by the camera during the visible portion of the spacecraft's 3AM-3PM 2-hourly polar orbit. Consequently, a MDGM represents Mars as seen at around 3PM on each Mars day (sol). There is 1 overlap swath between consecutive days. For example, the 13^{th} swath for day 1 is the same as the 1^{st} swath of day 2, and so on. Missing or unusable swaths are treated as missing data for the corresponding day.

Since a MDGM includes data taken during a period of approximately one day, it corresponds to a range of imaging time and solar longitude (L_s) values. We provide the list of MARCI filenames used to create each MDGM in the index folder for each filter. A user can use the "START_TIME" and "STOP_TIME" in the header of each MARCI image (available at the PDS) to obtain the exact time range. The MARCI filename is in the format of PPP_NNNNN_TTTT_MX_00NBBBW, where PPP is the mission subphase and TTTT is the solar longitude at the start of the image (in units of 0.1 degree). TTTT can therefore be used to represent the approximate L_s value for the MARCI image swath. A full description of MARCI filename convention can be found in the marcisis file in the MARCI PDS archive. To simplify the usage of MDGMs, we provide the Mars year and approximate L_s value for each day in the "PPP_ls.txt" file in the index/color folder. The L_s value corresponds to the middle swath used for the MDGM.

The version 2.0 MDGMs result from an upgrade from the version 1.0 MDGMs [Wang and Richardson, 2015]. The procedure used for version 2.0 is described in the "processing" file in this folder. Version 2.0 includes both 0.1 degree by 0.1 degree and 0.05 degree by 0.05 degree maps for the visible filters, while version 1.0 only has 0.1 degree by 0.1 degree maps. Moreover, version 2.0 has gone through more extensive image processing to reduce artifacts in the final product. In spite of the effort, some residual artifacts inevitably remain. These are not treatable using the current processing pipeline. Further improvement will require manual correction on a case-to-case basis, which is beyond the capability of version 2.0. Known problems are listed in the "errata" file in this folder.

MARCI has 5 visible (band1: blue, band2: green, band3: orange, band4: red, band5: nir) and 2 UV (band6: short_uv, band7: long_uv) filters [Bell et al., 2009]. Therefore, there are usually 7 black-and-white MDGMs for each spatial resolution (0.1 degree or 0.05 degree) on each day - one for each filter. Occasionally, a MARCI image swath only has 3 visible filters (band1, 2, and 3). In this case, the MDGM affected by the swath will have missing values (0) corresponding to the missing filters. In addition to black-and-white MDGMs on each day, a color MDGM is created for each resolution by combining 3 visible MDGMs (normally band4, band2, and band1, or occasionally band3, band2, and band1). The 0.1 degree MDGMs are in the data/ folder. The 0.05 degree MDGMs are in the data_resx2/ folder.

The MRO MARCI MDGM dataset is meant to provide a quick-and-easy way of displaying albedo features (dust storm, condensate cloud, or surface) on Mars each day. Users are free to stretch the maps any way they desire. Please note that MDGMs are not intended to be converted to physical units for radiance

related studies. For those studies, we suggest that the user perform radiometric processing on MARCI EDR images.

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Reference

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